



## COMMENTS ON THE DEVELOPMENT OF PROSUMER ENERGY IN POLAND

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### **Abstract**

*The aim of study was to analyse and assess the conditions for the development of prosumer energy in Poland. The assessment was based on the analysis of legal and financial aspects, as well as statistical data included in the reports on connected energy installations. The concept of prosumer, micro-installation and energy cluster was defined. The selected legal regulations concerning micro-installation and possibilities of financing prosumer activities were indicated.*

**Key words:** *prosumer energy; micro-installation; energy cluster.*

### **INTRODUCTION**

The energy and climate policy adopted by various European countries is different and it uses various support mechanisms for renewable energy sources. In connection with the above, each Member State has its national action plan regarding renewable energy in relation to the production of electricity and heating until 2020. For the effective realization of the adopted assumptions, the European Commission has issued a communication concerning the climate and energy framework for the years 2020-2030. The targets specified in this communication are to ensure the implementation of a long-term strategy for building a competitive low-emission economy, assuming the reduction of internal emissions by 80% until 2050 – compared to their level in 1990 (*Communication from the Commission to the European Parliament, 2011a; Communication from The Commission to The European Parliament, 2011b*). In Poland, one of the methods to reduce greenhouse gas emission is the development of prosumer energy. In the prosumer model, the end user installs electricity or heat generating devices in this facility and produces energy for his needs. Moreover, the user has the option of reselling any surplus to the network. It should be emphasized that the energy prosumer is usually characterized by high sensitivity to environmental problems and he consciously takes actions to protect the surrounding nature. Hence, he often has a broaden knowledge of products and services and willingly shares it with others (*Suchacka, 2015; Żabińska, 2017*).

### **MATERIALS AND METHODS**

Data from secondary sources were used for the analysis in this article. The secondary data came from internal sources such as the following:

- data from statistical offices listed in the bibliography;
- data from government administration authorities (including information from the Internet);
- national and international regulations and legal acts;
- studies and publications listed in the bibliography.

#### ***The concept of prosumer in legal terms***

According to Article 2 point 27a of the Renewable Energy Sources Act (Journal of Laws of 2018, item 1269), the prosumer is a final consumer purchasing electricity on the basis of a comprehensive contract, who generates electricity only from renewable energy sources in micro-installation for his own needs, which are not related to the conducted business activity...”.

Currently, prosumers connected to the network operate in the system of discounts. The discount rate is 1:0.8 for installed electrical power not more than 10 kW or 1:0.7 for installed electrical power greater than 10 kW. Therefore, the system of discounts can be compared to an energy accumulator, from which you can recover from 70% to 80% of energy. Pursuant to the Renewable Energy Sources Act, a prosumer provides to the seller (for free) the rest of energy. From the amount of settled electricity, in the manner referred to in section 1, the prosumer does not pay to the seller fees for its settlements and fees for the distribution service, the amount of which depends on the amount of electricity received by



the prosumer. These fees are paid by the seller to the operator of the electricity distribution system, which is connected to the micro-installation.

### ***The concept of microgeneration***

Microgeneration is the production of electricity or thermal energy on a small scale with the use of low-emission technologies or technologies based on renewable energy sources. A common feature of microgenerators is their connection to a low voltage network with a rated current, which is not higher than 16A (*PN EN 50549-1:2019*). The Polish legal system includes the concept of micro-installation, which is not synonymous with the term microgeneration, because it concerns a renewable energy sources installation with a total installed electrical power not more than 50 kW, connected to the network with a rated voltage lower than 110 kV or with a heat-generating power in the combination not exceeding 150 kW, in which the total installed electrical power is not higher than 50 kW (*The Renewable Energy Sources Act*). As it was pointed out by one of the researchers, the term “micro-installation” is misleading, because it could also be associated with a low-power installation, in which a non-renewable production source was applied, or with a receiving micro-installation – and the legislator thought about the generating micro-installation.

### ***Energy clusters***

Researches conducted by Jabłońska on energy clusters as tools for supporting the development of modern power systems have shown that the majority of cluster initiatives in the field of renewable energy and environmental protection run a little innovative business. However, the author drew attention to their important role in three areas (*Jabłońska, 2015*):

- Education and information through training, expert advices, information campaigns, conferences, etc.;
- Acquisition of EU funds for the purchase of installations in the field of renewable sources;
- Creation of cooperation platforms between cluster participants and creation of cooperation between them.

Therefore, it can be concluded that cluster initiatives have a significant impact on the development of prosumer energy. Their role was also recognized by entities responsible for creating energy policy what ultimately led to the regulating the concept of energy clusters under the current Renewable Energy Sources Act. According to the definition contained in Art. 2 point 15a of the above-mentioned Act, an energy cluster is a civil law agreement that may gather natural persons, legal persons, units, as well as research institutes or local government units. The subject of activity of the energy cluster must be the generation and balancing of the demand, distribution or trade in energy from renewable energy sources or from other sources or fuels, within a framework of distribution network with a rate voltage lower than 110 kV. The area of the cluster’s activity may not exceed borders of one district or 5 municipalities. The cluster’s activity may not concern cooperation with neighboring countries. Coordinator of the cluster is a cooperative, association, foundation or any member of the energy cluster indicated in a civil law agreement (hereinafter referred to as “energy cluster coordinator”) established for this purpose.

In order to cooperate with a given cluster, the operator of the electronic distribution system is obliged to conclude a contract for the provision of distribution services with the cluster coordinator on the basis of Article 38.

In conclusion, it can be stated that the energy cluster is a new approach in running economic projects in the area of energy in Poland. The main goal of energy clusters is to create optimal conditions for the development of distributed energy. Opening of the cluster for different stakeholders should activate the local community to take environmentally friendly actions based on the use of renewable energy sources. The result of the cluster’s activity should also be the improvement of local energy security, development of technologies and innovativeness in the area of energy, as well as increase of competitiveness of local enterprises.

### ***Financial support for prosumers***

An important element of the growing interest in micro-installations for renewable energy sources is the state policy regarding financial support for this type of installations. Currently, it is possible to

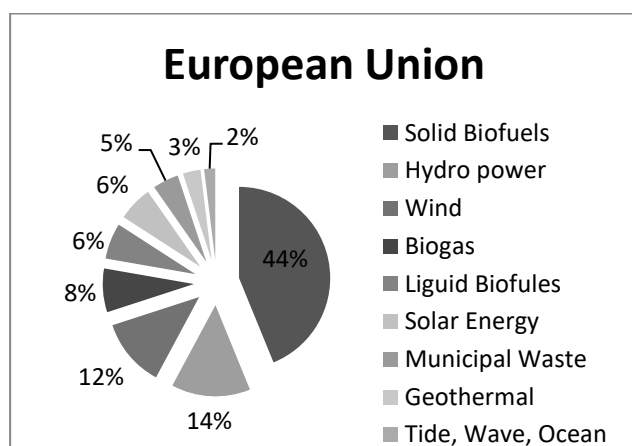


support prosumers under the Renewable Energy Sources Act and within the framework of the ENERGY PLUS program. Until 2016, it was possible to take advantage of the co-financing programs, such as: PROW, Prosumer, LEMUR. Support under the Renewable Energy Sources Act applies only to prosumers producing electricity, while the Rural Development Program (PROW) and the programs of the National Fund for Environmental Protection and Water Management (NFEPWM) also include manufacturers of thermal energy. The Institute for Renewable Energy (IRE) has assessed the impact of the Priority Program of the NFEPWM “Prosumer” on the development of the RES micro-installation sector. In the opinion of the IRE, the “Prosumer” program did not support prosumer activity in a systemic manner, and the funds available in the program could not be “*treated as a basic or even complementary instrument ensuring the profitability of investments in RES micro-installations*” [12]. However, according to the author of this article, the program aroused public interest and disseminated the idea of prosumer energy. The proof of this may be an increase in the number of micro-installations in the last two years (2014-2016). From 1 March 2019, applications within the framework of a new priority program – “Energy Plus” can be submitted. The aim of this program is to reduce the negative impact of enterprises on the environment, including to improve air quality, by supporting investment projects. The program should encourage the installation of own energy source through simplified investments and a lower (8%) VAT tax for installations assembled on land or in farm buildings.

## RESULTS AND DISCUSSION

### *The development of RES and microgeneration*

According to the data from the European Statistical Office, the share of energy from renewable sources in final energy consumption among all EU Member States was 17% in 2016 and increased by 0.9 percentage points compared to 2014 and by 3.8 compared to 2011 (*Eurostat Statistic Explained*). Pursuant to the Directive 2009/28/WE, the further increase of this ratio up to 21% in 2020 and up to 24% in 2030 is expected (*Communication from the Commission to The European Parliament, 2014*). Due to the fact that each country set its own target for 2020, as early as in 2014, eleven countries reached the assumed value, and thirteen countries exceeded the value determined in the above-mentioned Directive. In Poland, this goal was set at the level of 15% and in 2016 it reached the value of 11.3% (decreasing by 0.4 percentage points compared to 2015) (*Eurostat Statistic Explained*). Analysis of GUS data shows that both in Poland and in Europe, solid biofuels are the most frequently obtained primary energy from renewable sources. Against the background of the European Union, Poland has worse results in acquiring primary energy from such sources as: municipal waste, geothermal energy, solar energy (Fig. 1 and Fig. 2).



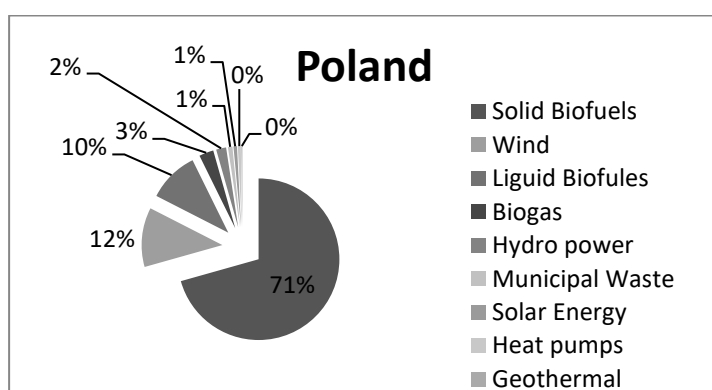
**Fig. 1** Structure of primary energy production from renewable sources in EU in 2016 (*Energy 2018*)

The analysis of reports prepared by electricity distribution network operators (DNOs) published in the Public Information Bulletin on the website of the Energy Regulatory Office indicates that the prosumer market in Poland began to develop very dynamically in the last two years (*Energy Regulatory Office, 2019b*). In 2018, the number of customers, who installed their own power sources for the purpose of selling part of the energy to the network, amounted to 51 163, while the total amount of



electricity introduced by the prosumer to the network was 130 370.162 MWh (*Energy Regulatory Office, 2019c*). In 2015, the number of assembled micro-installations amounted to 4 691, while in 2016 – 12 860 – this constituted 75% of all micro-installations. In 2018, the total number of micro-installations amounted to 55 502. According to statistics provided by the Energy Regulatory Office, at the end of December 2018, the total installed power of renewable energy sources in Poland exceeded 8.59 MW. Detailed information on the installed power of micro-installations and its structure is presented in Table 1. The data in the table applies to particular types of installations for renewable energy sources, including installations that obtained:

- concession for the production of electricity;
- entry into the register of regulated activities carried out by the President of the Energy Regulatory Office (register of energy producers in a small installation);
- entry into the register of regulated activities of the President of the Agricultural Market Agency (register of agricultural biogas producers);
- micro-installations applying for the issue of certificates of origin.



**Fig. 2** Structure of primary energy production from renewable sources in Poland in 2016 (*Energy, 2018*)

**Tab. 1.** Installed power [MW], as at 31.12.2018 (*Energy Regulatory Office, 2019*)

Type of RES installation	Installed power [MW]					
	2005	2013	2015	2016	2017	2018
Installations using biogas	31.972	162.241	212,497	233.967	235.377	237.618
Installations using biomass	189.790	986.873	1 122,670	1 281.065	1 362.030	1 362. 870
Installations using solar radiation energy	-	1.901	71.031	99.098	103.896	146,995
Installations using wind energy	83.280	3 389.541	4 582.036	5 807.416	5 848.671	5 864.443
Installations using hydropower	852.495	970.128	981.799	993.995	988.377	981.504
Total	1 157.537	5 510.684	6 970.033	8 415.541	8 538.341	8 593.430

According to the data presented by the DSO in the reports of 2018, the majority of micro-installations were connected to such operators as: TAURON Dystrybucja S.A. (1406 pcs.), PGE Dystrybucja S.A. (1139 pcs.) and Energa Operator (1019 pcs.). The analysis of the data included in these reports also shows that solar installations constitute approx. 99.3%, hydroelectric plants – 0.5% and wind farms – about 0.1%. Biomass and biogas installations have a negligible market share. The significant advantage of photovoltaic power plants is primarily connected with the availability of equipment and specialist assembly companies on the market, as well as with the smallest environmental requirements. The opposite situation occurs in relation to hydroelectric and wind power plants, where the important criterion for the selection of this type of installation is the location conditions. Another factor affecting their lower popularity is the high price of the installation.

***Comments on the development of renewable energy sources and microgeneration***

The discrepancy in the structure of receiving primary energy from renewable energy results from the geographic conditions of individual countries, but energy policy and the support system for renewable



sources also play an important role (Piria *et al.*, 2014). The Polish government is not conducive to the policy of obtaining energy for renewable energy sources, which was reflected in the lack of agreement in terms of climate neutrality of the European Union until 2050. Poland belongs to the group of countries with economy largely based on coal. This is the main problem in the implementation of the European Union's energy and climate strategy. According to the Polish government, coal, as an energy resource located on the territory of the Union, may provide energy security and competitiveness of the EU economy. Furthermore, the development of renewable energy sources (RES) under the current regulations, supply and prices may lead to the increasing exploitation and degradation of the natural environment in third countries.

The Institute for Renewable Energy (IRE) has assessed the impact of the Priority Program of the NFEPWM "Prosumer" on the development of the RES micro-installation sector. In the opinion of the IRE, the "Prosumer" program did not support prosumer activity in a systemic manner, and the funds available in the program could not be "*treated as a basic or even complementary instrument ensuring the profitability of investments in RES micro-installations*" (Rosolek, Boelsta & Wiśniewski, 2014). However, according to the author of this article, the program aroused public interest and disseminated the idea of prosumer energy. The proof of this may be the increase in the number of micro-installations in the last two years (2014-2016). In 2018, the government program "Clean Air" was launched. The aim of this program was to support (among others) installation of modern heating devices, including renewable energy sources. Currently, the European Commission's experts warn that in its current form, the program is doomed to failure and it cannot count on the support of EU funds. According to the experts, it is necessary to simplify the application procedures and build an effective system of services for beneficiaries.

## CONCLUSIONS

As a result of the analysis of the conditions for the development of prosumer energy, the following conclusions can be drawn:

- Microgeneration is becoming more and more popular in both rich and developing countries. The most important factors for the development of distributed energy include:
  - dependence on electricity – the use of an increasing number of electrical devices;
  - poor transmission infrastructure;
  - insufficient powers in the energy system;
  - possibilities resulting from the development of new technologies;
  - uncertainty of energy prices.
- Due to the Poland's economic policy, which is largely based on coal, actions for the development of prosumer energy undertaken by the Polish government are moderate in character. This is evidenced by a small number of implemented micro-installations compared to other European countries, critical opinions of institutions and experts dealing with renewable energy in Poland and the lack of systemic support for prosumers. Therefore, there is a need to develop mechanisms / principles of cooperation and exchange of experiences in the promotion and development of innovative pro-ecological society and distributed energy. Clusters are a change to develop effective mechanisms of cooperation between prosumers and entities of the so-called centralized energy.
- Poland, due to the disproportions connected with the distribution of large generating capacities, has favorable conditions for the development of distributed micro-energy. Unfortunately, state actions concerning the removal of barriers (energy and billing, financial and technical) for microgeneration are insufficient. The centralized model of the energy market still dominates in Poland.
- The European Commission has determined targets for renewable energy and greenhouse gas emissions for the successful implementation of EU climate and energy policies. Unfortunately, the Renewable Energy Sources Act provides support only for prosumers, who produce electricity.
- Co-financing for installations that generate thermal energy is provided only by two programs: "Clean Air", for which the EU funding can be suspended, and "Energy Plus".
- Despite insufficient incentives and support from the state in eliminating energy, billing, financial, technical and information barriers, the implementation of micro-installations in Poland is constantly growing, which probably results from the growing environmental awareness of the society, as well as technical and economic opportunities.



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